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Remains of *Zygolophodon turicensis* (Proboscidea, Mammutidae) from the coal mines near Bitola, Republic of Macedonia

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Abstract. We report *Zygolophodon turicensis* (Schinz, 1824) from the Miocene deposits in a coal mine near Bitola, Republic of Macedonia, and refer a misidentified molar from Nerezi near Skopje published in the 1930s to the same species. *Zygolophodon turicensis* is a new taxon to the fossil fauna of Macedonia, and the finds discussed in the paper are among the few fossils of pre-Turolian age from the country.

Key words: Proboscidea, Mammutidae, *Zygolophodon*, Miocene, Macedonia

Introduction

The specimens described below are an accidental find from the coal mines of the thermal power station near Bitola in the southwest of the Republic of Macedonia. Found in sandy deposits, the molars most probably belong to the same individual.

Material and methods

Material: Left and right m2-m3, coal mine near Bitola, stored at the Bitola Natural History Museum (BiNHM), coll. no. 13536.

Methods: Dental nomenclature follows TASSY (1996). Measurements (in mm) taken by B. Garevska.

Systematic palaeontology

Order Proboscidea Illiger, 1811
Family Mammutidae Hay, 1922
Genus *Zygolophodon* Vacek, 1877
Zygolophodon turicensis (Schinz, 1824)

All four molars (Fig.1, Fig. 2) are in a rather good condition. The left m2 is preserved very well. The crown is intact, together with a large portion of the posterior root and the base of the

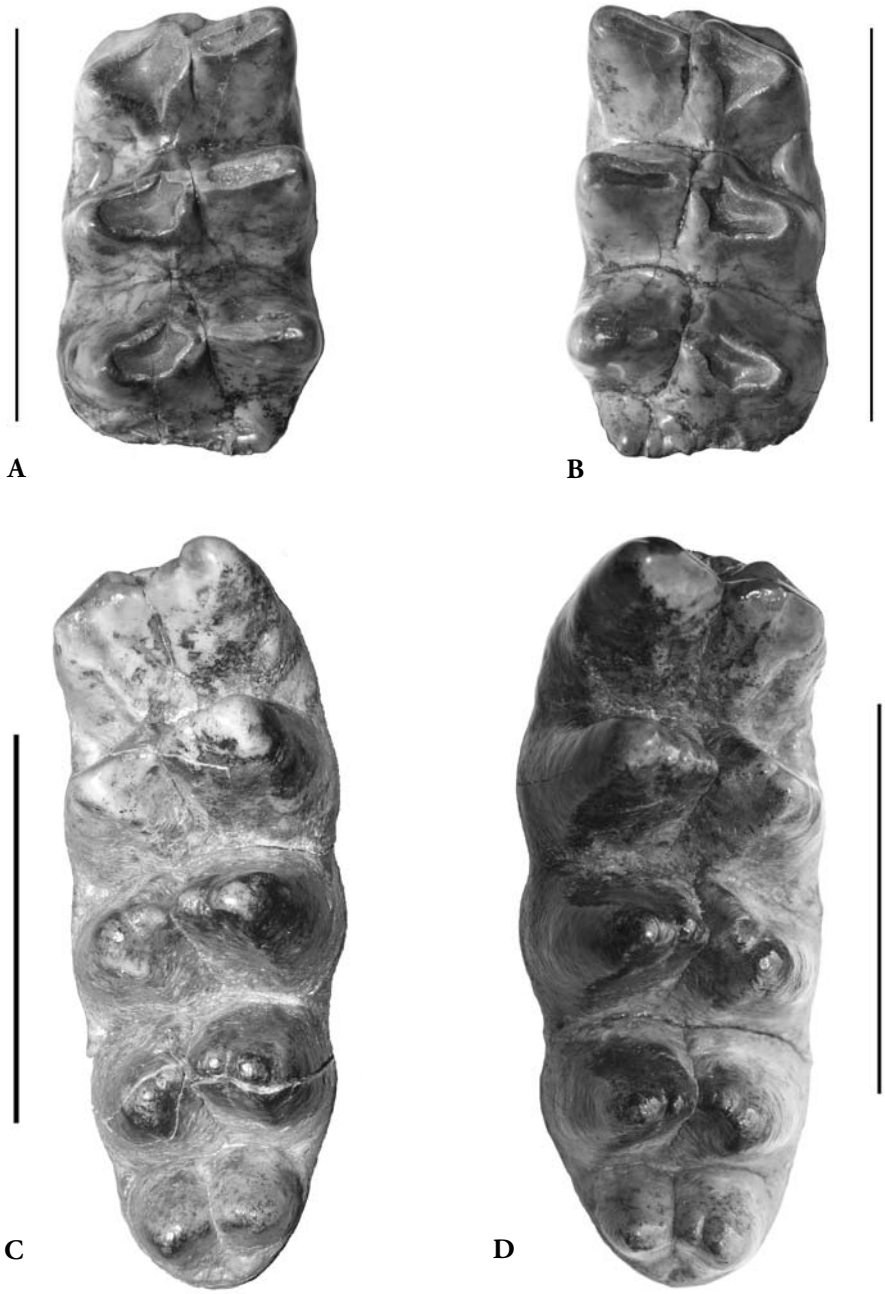

Fig. 1. *Zygolophodon turicensis*, left and right lower second and third molars (BiNHM 13536), coal mine near Bitola, occlusal view. A: m2s, B: m2d, C: m3s, D: m3d. Scale bar: 10 cm

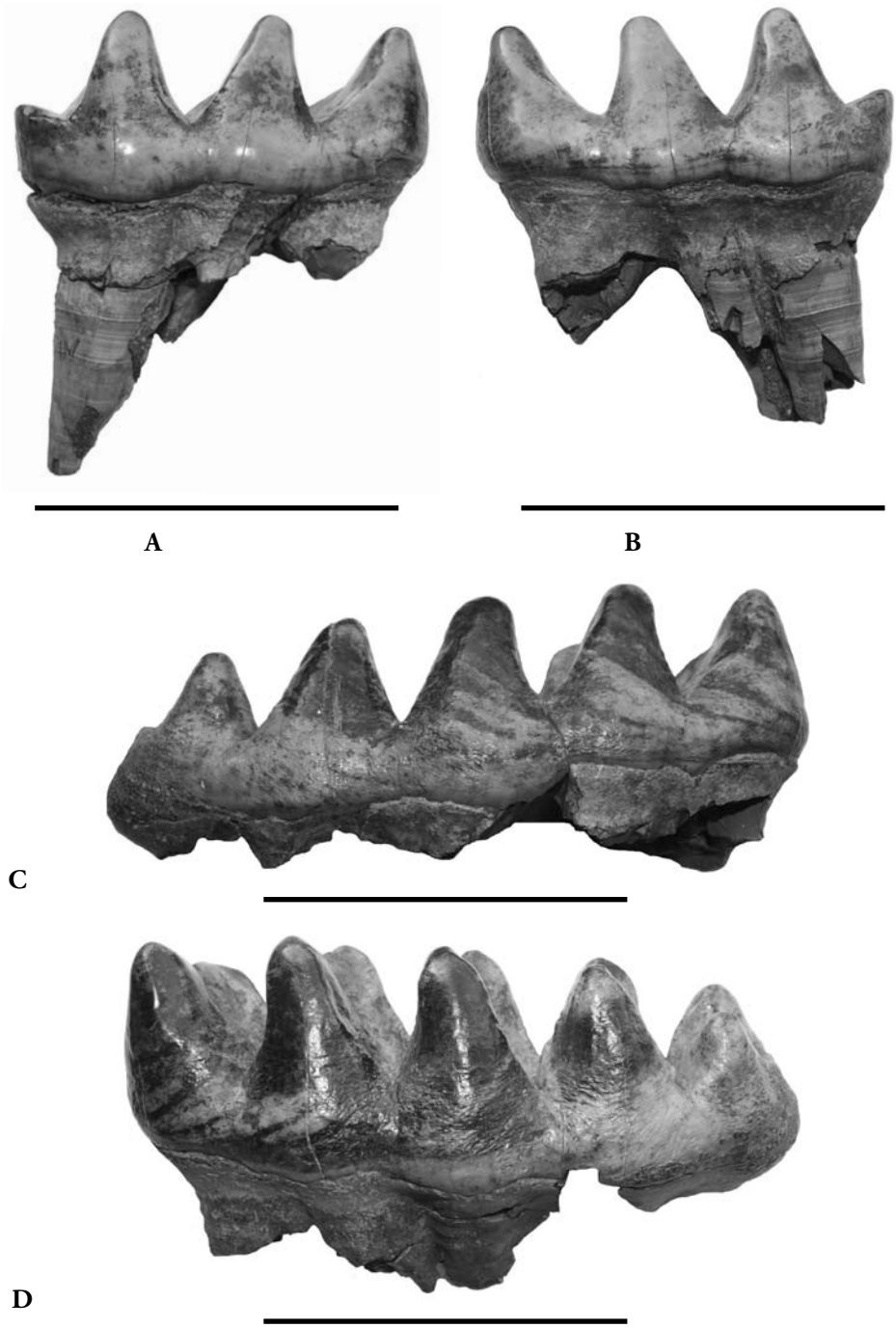

Fig. 2. *Zygolophodon turicensis*, same specimens as Fig. 1, lingual view. Scale bar: 10 cm

anterior one. Dentine is exposed on all three lophids (including the third posttrite, which is at an early stage of wear). The posterior talonid is weak, better developed on the posttrite side. Pressure marks are well visible on the anterior as well as the posterior talonids. Interlophids are wide, with pretrite zygodont crests contacting in the first. Posttrite zygodont crests are weak. In lingual view, height of the lophids is visibly larger than their antero-posterior length, as well as than the height of the lingual cingulum. The first two lophids display the oblique arrangement typical for lower molars of mammutids (see TOBIEN, 1975). L: 114; Wmax: 70; H: 51; ET: 3-4.

The right m2 is in an even better condition than the left one, with the crown and much of the roots intact. Compared to the left m2, it has a stronger posterior talonid. L: 114; Wmax: 70; H: 52; ET: 3-4.

Both lower third molars have very well preserved crowns. Both are at a very early stage of use. Each of the two molars has visible wear traces on its first lophid (although the dentine is not exposed), and very slight traces on the second and third. The left m3 has five lophids and a very weak posterior talonid. Pretrite zygodont crests are well developed, especially on the first three lophids. Posttrite zygodont crests are weak but present. The typical oblique position of the lophids is seen on the first two lophids (on the posterior ones, the posttrite halves are more or less perpendicular to the median sulcus). The interlophids are not very broad, there are very slight traces of cement. L: 194; Wmax: 82; H: 66 (on third pretrite).

Compared to the left one, the right m3 has an even weaker posterior talonid. The pretrite zygodont crests are well developed on the first three lophids, the posttrite zygodont crests are stronger than in the left m3. L: 195; Wmax: 84; H: 65 (on third pretrite).

Discussion

Presence of zygodont crests and absence of additional cuspids on the Bitola molars safely allocate them to the family Mammutidae. Height of the lophids in relation to their antero-posterior length and the lingual cingulum height is a character distinguishing *Zygolophodon turicensis* (and other species of the genus *Zygolophodon*) from the derived mammutid "*Mammut*" *borsoni* and related forms (for a recent discussion, see TASSY, 1985; on the generic assignment of "*M.*" *borsoni* and a closely related Turolian species see MARKOV, 2004, 2008).

Zygolophodon turicensis is known throughout Europe from the early to the late Miocene, (Orleanian, MN3b, to Vallesian, MN10: TASSY, 1990) or ca. 20-10 Ma. As demonstrated by TASSY (1985), *Z. turicensis* is a polymorph species but neither size nor morphology can be correlated with a particular age. An apparently derived condition observed in the Bitola molars is the presence of full five lophids. In this aspect, they are more advanced than e.g. those from Malartic described by TASSY (1977). With no directly associated fauna, however, the age of the Bitola specimens cannot be determined with precision.

Although not reported previously from Macedonia, *Z. turicensis* is actually present in the country's fossil fauna with yet another find – an upper right M3 from Nerezi near Skopje, originally described as m3 of "*Mastodon angustidens* f. *subtapiroidea*" by LASKAREV (1936, Pl. 3, Fig. 4). This tooth probably has its counterpart in an "m3 sin" from the same locality (and seemingly the same individual) mentioned but not figured by LASKAREV (1936, p. 112).

The *Zygolophodon turicensis* material from Bitola and Nerezi discussed here represents a new taxon to the fossil fauna of the Republic of Macedonia and, together with other finds from Skopje and its vicinities described by LASKAREV (1936) and GAREVSKI (1985), is a rare

case of pre-Turolian vertebrate fauna from the country. Most of the proboscideans known from Macedonia are Turolian or later: see e.g. GAREVSKI (1960a, 1960b, 1976, 1997), GAREVSKI & MLADENOVSKI (2006).

Summary and conclusions

The four molars from a coal mine near Bitola, Republic of Macedonia, are referred to *Zygolophodon turicensis* (Schinz, 1824), known in Europe from the early to the late Miocene (Orleanian to Vallesian, MN3b to MN10), or ca. 20-10 Ma. An upper molar from Nerezi near Skopje, published in the 1930s as a lower molar of "*Mastodon angustidens* f. *subtapiroidea*" (i.e. *Gomphotherium subtapiroideum*) is misidentified and belongs in *Zygolophodon turicensis* too. This is a new taxon to the fossil fauna of Macedonia. Pre-Turolian proboscideans (and vertebrates in general) are rare for the country, and the *Z. turicensis* material discussed here, together with other finds from Skopje and its vicinities published by LASKAREV (1936) and GAREVSKI (1985) are among the few pre-Turolian fossils from the Republic of Macedonia. The Bitola molars are an isolated find of unknown stratigraphy, hence their age cannot be determined with any precision and could be early to late Miocene.

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Останки от *Zygolophodon turicensis* (Proboscidea, Mammutidae) от въглищните мини в района на Битоля, Република Македония

Ристо ГАРЕВСКИ, Биляна ГАРЕВСКА, Георги Н. МАРКОВ

(Р е з ю м е)

Статията описва четири молара на *Zygolophodon turicensis* (Schinz, 1824), вероятно принадлежащи на един и същ индивид, от миоценските наслаги на въглищна мина до Битоля, Република Македония. Към същия вид е отнесен е и един молар от Нерези до Скопие, публикуван през 30-те години на 20 век и погрешно определен. *Zygolophodon turicensis* е нов вид за фауната на Македония, а находките, дискутирани в статията, са сред малкото фосили с предтуролска възраст от страната.